

Descriptions of three new species of *Gulella* (Mollusca, Gastropoda Pulmonata: Streptaxidae) from South Africa

by

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SYNOPSIS

The following new species are described and figured: *Gulella inobstructa* (Transvaal), *G. obstructa* (Cape Province), *G. barnardi* (Transvaal).

Connolly (1939) enumerates a total of 129 species of the pulmonate family Streptaxidae in his monumental monographic survey of the non-marine Mollusca of Southern Africa. The majority of these, 123 species in all, belong to the genus *Gulella* L. Pfeiffer, 1856. With comparatively so small a number in this widely distributed and very diverse genus, a certain amount of new species may confidently be expected. Two new streptaxids from Mozambique have already been described (Van Bruggen, 1964), and further studies of extensive series of *Gulella* in the Natal Museum have revealed some more interesting new species of which three are described here. These species were collected by Dr. R. F. Lawrence, to whom great credit is due for particularly numerous contributions to the material of the family Streptaxidae in the Natal Museum's malacological department.

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Gulella inobstructa n.sp.

A smooth, medium-sized species of *Gulella* with only four teeth in a little obstructed aperture, viz., a parietal, labral and two columellar processes.

Shell (fig. 1) medium-sized, subcylindriform, rimate or with closed umbilicus, smooth and glossy, creamy white. Spire produced, sides flat, slightly convex, apex flattened. Whorls eight, nearly flat, smooth, except for some very fine growth striae and hardly noticeable spiral sculpture; sutures shallow. First two whorls minutely and not very densely granulate, only visible under high magnification, otherwise smooth. Aperture (fig. 4) quadrate, rounded at base, peristome somewhat reflected, white and glossy, dentition four-fold. Dental processes comparatively small, little obstructing aperture; on the right of paries a well-developed, incurved, angular lamella, scarcely connected with the labrum; strong, superficial, labral tooth halfway down the outer lip, corresponding to a shallow outside pit; no process on base; small, superficial, blunt tubercle on upper columellar margin, opposite, but a trifle higher than, labral process; inner columellar lamella poorly

developed, deeply situated, almost straight, slightly oblique compared to the axis of the spire of the shell.

Animal unknown.

Measurements of shell: length 9.1 mm. (holotype), 8.3 mm. (paratype); maximum diameter 4.5 mm. (holotype), 4.2 mm. (paratype); length/maximum diameter 2.02 (holotype), 1.98 (paratype); length last whorl 4.3 mm. (holotype), 4.1 mm. (paratype); length aperture 2.5 mm. (holotype), 2.4 mm. (paratype); width aperture 2.5 mm. (holotype), 2.4 mm. (paratype) (aperture measurements have been taken externally.)

Holotype: South Africa, Transvaal, Magoebaskloof, Woodbush Forest, 4000-5000 ft., March 1960, leg. R. F. Lawrence (Natal Museum Moll. No. 4123, Type No. 1087).

Paratype: same data (Natal Museum Moll. No. 4123, Type No. 1088), animal withdrawn, kept in spirits.

There is also a juvenile which presumably belongs to the same species; this specimen, however, cannot be considered a paratype. All three specimens were taken in humus in indigenous forest.

Gulella inobstructa quite clearly belongs to Connolly's (1939) second major division of species, which have a duplex columellar process. It occupies a somewhat isolated position in this group as it cannot be fitted in anywhere. Indeed, one of the few species to which *G. inobstructa* seems to show some likeness, is *G. elliptica* (Melvill & Ponsonby, 1898) var. *manca* (Burnup, 1914); although the dental processes in the aperture resemble those of the new species, *G. elliptica* var. *manca* can be distinguished immediately by its much smaller size (usually under 4 mm.), the cylindric shape and various other minor characters.

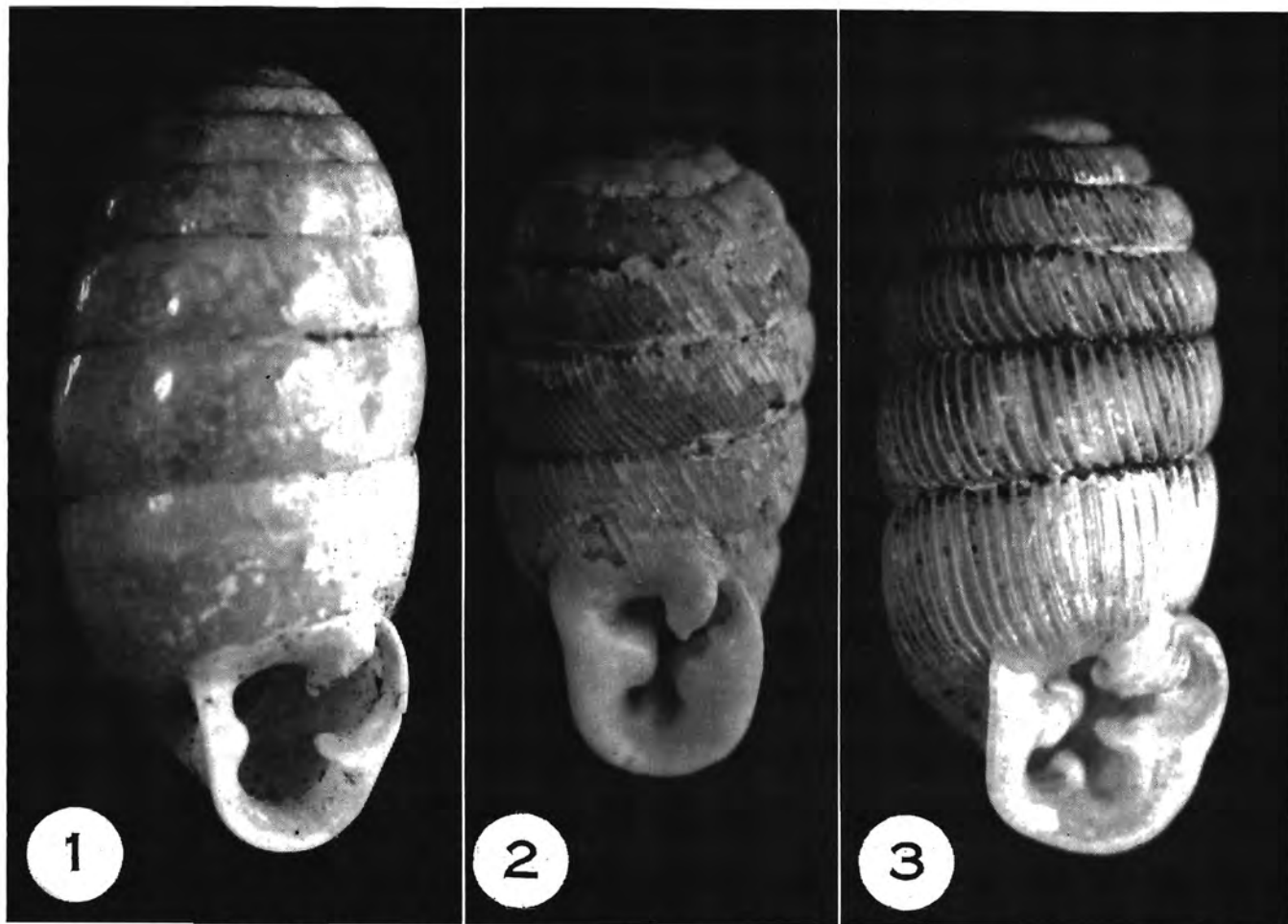
G. inobstructa obviously is related to *G. pervitrea* (Preston, 1913) and its allies, which group has its headquarters in East Africa (see e.g., Verdcourt, 1962); *G. nepia* Connolly, 1925, is the Southern African representative of this group. It is much smaller than *G. inobstructa* (up to 5.3 mm.) and the columellar tubercle is not as superficial as the one in the newly described species. Connolly considers *G. nepia* to belong to his first major division of species with a single columellar process.

G. pervitrea very probably occurs in Southern Africa (Van Bruggen, 1964) and *G. inobstructa* may thus be considered the southernmost representative of the group. None of the other species have crossed the Limpopo and so far only *G. pervitrea* and *G. nepia* are known south of the Zambezi. Most of the known species in this group have been recorded from highlands and in this respect *G. inobstructa* from the Drakensberg Escarpment also agrees with the general picture of this group of difficult species.

Gulella obstructa n.sp.

A small striate species of *Gulella* with seven-fold dentition, viz., a parietal, sinular, two labral, a basal and two columellar processes, of which the superficial columellar process is comparatively large, while the inner columellar lamella is very poorly developed.

Shell (fig. 2) small, cylindrical, rimate, striate, creamy white. Spire produced, sides flat and almost parallel, apex flattened. Whorls $6\frac{1}{2}$ -7, very little convex, sculptured with close, regular, straight, oblique costulae, interstices slightly granulate; sutures subcrenulate. First $1\frac{1}{2}$ whorls finely granulate and smooth. Aperture (fig. 5) comparatively large, quad-



Figs. 1-3.—Holotype shells of 1. *Gulella inobstructa* n.sp., 2. *Gulella obstructa* n.sp. and 3. *Gulella barnardi* n.sp. Actual size 9·1, 5·4 and 6·3 mm. respectively. Photographs B. R. Stuckenberg.

rate, rather obstructed by dental processes, peristome thick, expanded, somewhat reflected, white and glossy, dentition seven-fold. On the right of paries a well-developed incurved angular lamella, touching the labrum at its apex; a small tubercle in labral sinulus, usually so small as to be a mere swelling; thick labral complex consisting of superficial, sharp, upper denticle and lower, deeper, blunt tooth, which latter corresponds to a fairly deep outside pit; small basal tooth just left of the middle of the base, corresponding to minute, very shallow outside pit; outside columellar tooth superficial, well-developed, square, inner columellar lamella deeply situated, small and blunt, completely hidden behind outer process.

Animal unknown.

Measurements of shell: length 5.4 mm. (holotype), 5.7 mm. (paratype); maximum diameter 2.9 mm. (holotype), 2.8 mm. (paratype); length/maximum diameter 1.86 (holotype), 2.04 (paratype); length last whorl 3.0 mm. (holotype), 3.0 mm. (paratype); length aperture 2.0 mm. (holotype), 2.2 mm. (paratype); width aperture 1.7 mm. (holotype), 1.8 mm. (paratype) (aperture measurements have been taken externally).

Holotype: South Africa, Cape Province, Glenconnor (N.W. of Port Elizabeth), 3 April 1964, leg. R. F. Lawrence (Natal Museum Moll. No. 4124, Type No. 1089).

Paratype: same data (Natal Museum Moll. No. 4124, Type No. 1090).

A third specimen appears abnormal; while clearly being a juvenile shell, measuring only 4.9 mm., it has a fully developed aperture with a complete set of dental processes. Consequently this specimen cannot be considered a paratype. All three specimens were taken at approximately 1000 ft. on the ground in low, dense, dry bush, characterised by aloes and "spekboom" (*Portulacaria afra* Jacq., fam. Portulacaceae).

Gulella obstructa obviously belongs to Connolly's (1939) second group of species, viz., those with a duplex columellar process. Unfortunately Connolly's subdivision of this group is somewhat unsatisfactory because of the occasional presence of a sinular denticle (usually merely in the form of a low swelling) in groups where no mention of this additional process has been made. Well-developed sinular denticles only occur in Connolly's groups 16 and 18.

G. obstructa somewhat resembles *G. dunkeri* (Pfeiffer, 1855), which latter however is much larger, and has a well-developed sinular denticle, while at the same time labral and columellar lamellae are rather different.

In group 18 *G. obstructa* may be compared to *G. crassidens* (Pfeiffer, 1859), *G. munita* (Melvill & Ponsonby, 1892), which is much smaller, and *G. tharfieldiensis* (Melvill & Ponsonby, 1893), which is also smaller and has in addition a parietal denticle. The latter three species all have rather different labral and columellar processes.

Ignoring the sinular swelling the present new species obviously belongs to either group 12 or 15, both with six-fold dentition; in the latter group there are no species which are sufficiently close for comparison.

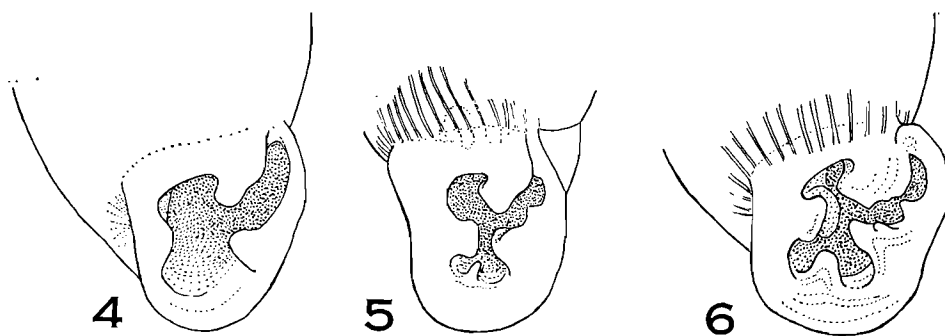
Comparison shows that of group 12 only *G. pentodon* (Morelet, 1889) and *G. euthymia* (Melvill & Ponsonby, 1893) have to be considered. Both species, however, show a number of differences which isolate *G. obstructa* as totally different. *G. pentodon*, so far only known from Port Elizabeth, is larger and has a less obstructed aperture, while the columellar and

labral processes have different shapes compared to those of the new species. *G. euthymia*, which occurs in the coastal districts of Natal, has two different labral processes and the inner columellar lamella is very prominent. The almost non-existent inner columellar lamella seems indeed one of the distinguishing characters of *G. obstructa*.

***Gulella barnardi* n.sp.**

A medium-sized species of *Gulella* with apical spiral sculpture and seven-fold dentition, viz., a parietal process, a complex labral process with three teeth, a basal process and two columellar processes.

Shell (fig. 3) medium-sized, subcylindriform, rimate, striate, creamy white. Spire produced, sides very slightly convex, apex flattened to a certain degree. Whorls 7-7½ very little convex, with fairly close, regular, straight, oblique (only slightly so in last whorl) and well-raised costulae, interstices smooth, slightly granulate, wider than costulae; sutures subcrenulate. First two whorls with marked spiral sculpture. Aperture (fig. 6) quadrate, somewhat rounded at base, peristome thick, expanded, somewhat reflected, white and glossy, dentition seven- (or eight-) fold. Most dental processes well-developed, on the



Figs. 4-6.—Apertures of holotype shells of 4. *Gulella inobstructa* n.sp., 5. *Gulella obstructa* n.sp. and 6. *Gulella barnardi* n.sp. All figures highly enlarged.

right of paries a well-developed angular lamella, which is very slightly bifid basally, connected with labrum at apex; a minute sinular denticle or swelling, which may be absent; labral complex consisting of three teeth, the upper small, blunt, but prominent, opposite angular lamella, second tooth a blunt swelling in the middle between upper and lower teeth, lower tooth long and prominent, but blunt, opposite middle of superficial columellar process, labral complex corresponding to fairly large, but shallow outside pit; large, blunt, basal process, more or less in the middle of base, corresponding to small, shallow outside pit; outside columellar process superficial, well-developed, square; inner columellar lamella deeply situated, well-developed, rounded, blunt and thick, protruding beyond outer columellar tooth.

Animal unknown.

Measurements of shell:

	<i>holotype</i>	<i>paratype 1</i>	<i>paratype 2</i>
length	6.3	6.3	6.3 mm.
maximum diameter	2.9	3.0	3.1 mm.
length/maximum diameter ..	2.17	2.10	2.03
length last whorl	3.2	3.2	3.2 mm.
length aperture	2.3	2.2	2.3 mm.
width aperture	2.1	2.1	2.2 mm.

(aperture measurements have been taken externally, the peristome of paratype 2 has been slightly damaged at the base).

Holotype: South Africa, Transvaal, roadside bush near Nelspruit, January 1939, leg. R. F. Lawrence (Natal Museum Moll. No. 4128, Type No. 1091).

Paratypes 1 and 2: same data (Natal Museum Moll. No. 4128, Type No. 1092).

Gulella barnardi has been named in honour of the late Dr. K. H. Barnard of the South African Museum, Cape Town.

This new species also obviously belongs to Connolly's (1939) second major group of species, viz., those with a duplex columellar process. In the apical spiral sculpture, however, it shows a character which is not altogether met with frequently in the genus *Gulella*. In Southern Africa this is only found in four species, of which *G. regularis* (Melvill & Ponsonby, 1893) belongs to the second group. *G. barnardi* is easily separated from the latter by size, shape and dentition.

The new species shows a distinct resemblance to certain species belonging to Connolly's subdivision 12 (with six-fold dentition). *G. euthymia* (Melvill & Ponsonby, 1893), *G. falconi* Burnup, 1925, and *G. pentodon* (Morelet, 1889) come closest to *G. barnardi*; none of these three species, however, has apical spiral sculpture and/or a labral complex as found in the above-described species.

Nothing like the present species has been found in our extensive Kruger National Park surveys, although it seems unlikely that it is confined to the Nelspruit area.

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